REMARKS/ARGUMENTS

Claims 1-20 have been canceled and newly added claims 21-40 are submitted herewith.

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Respectfully submitted,

By 

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A built-in lamp

The invention relates to a built-in ~~lamp having a holder for fastening in an installation surface, in particular a room ceiling, having a bulb fitting and having a reflector,~~ in accordance with the preamble of claim 1.

Built-in lamps of this kind are known from the prior art in a variety of forms. Dark-light lamps are known, among others, in which the illuminant and the reflector are arranged with respect to one another such that the illuminant can no longer be seen from a specific angle of view and thus cannot develop any glare effect. This avoidance of a glare effect, however, also results in the ceiling region of a space illuminated in this manner remaining largely non-illuminated and in the relationship between the light source and the illuminated region perceived as natural by a person being lost, since it cannot be recognized from which light source the light originates.

This effect is alleviated in accordance with the prior art in that a partly or completely frosted glass pane is secured in the region of the reflector opening disposed in the direction of illumination or beneath it in order to hereby generate diffuse light. However, the portion of the directed, direct light is thus partly or completely reduced, which is in turn disadvantageous.

Furthermore, built-in lamps are known from the prior art which avoid the aforesaid effect. With these built-in lamps, scattering reflectors, for example white reflectors, are used instead of specularly reflecting reflectors.

These scattering reflectors mean that the light source or its illuminated reflector becomes visible at practically all angles of observation, albeit with a disadvantageous glare effect again occurring.

~~An object of the invention consists of further developing a built-in lamp of~~ the initially named kind such that in each case, on the one hand, a glare effect is avoided in accordance with the dark-light principle and such that, on the other hand, it is ensured that the persons located in the illuminated room can perceive the light sources used for illumination consciously or even unconsciously such that a natural relationship is created between the light source and the illuminated region and a warm room climate is obtained in a technical lighting manner.

In accordance with the invention, the object is satisfied by the features of claim 1 and in particular in that the holder and the reflector are arranged relative to one another such that the reflector extends beyond the installation surface in a main direction of illumination, when the built-in lamp is secured in the installation surface, with the reflector being coupled in this region, which extends beyond the installation surface, to a reflection element extending perpendicular or at an angle to the main direction of illumination and arranged outside the reflector, said reflection element being able to be illuminated by light via the region lying between the installation surface and the reflection element.

In accordance with the invention, the reflector opening disposed in the main direction of illumination is therefore not located in the plane of the installation surface as with conventional built-in lamps in accordance with the prior art, but beneath this plane, which means that the reflector ~~projects out of the installation surface in the main direction of illumination~~.

Built-in lamps are furthermore known from the prior art in which the holder and reflector are arranged relative to one another such that the reflector extends beyond the installation surface in a main direction of illumination with the built-in lamp secured in the installation surface, with the reflector being coupled in this region extending beyond the installation surface, to a reflection element which extends perpendicular or at an angle to the main direction of illumination, is arranged outside the reflector, and is able to be illuminated by light via the region lying between the installation surface and the reflection element.
Built-in lamps of this type are disclosed, for example, in the documents EP 0 678 700 A1, FR 2 135 928 and DE 195 07 333 A1.
In accordance with these built-in lamps, the reflector opening disposed in the main direction of illumination is not located in the plane of the installation surface, but beneath this plane, which means that the reflector projects out of the installation surface in the main direction of illumination. In this manner, in its region projecting out of the installation surface, the reflector forms a securing possibility for the reflection element in accordance with the invention which extends outside the reflector, for example around it. When the reflection element is illuminated by light, a lighting of the installation surface from below results in that the said portion of the light coming from the reflection element provides a brightening of the ceiling.

It is common to all built-in lamps known from the three named documents that the reflection element is illuminated by light via the reflector opening disposed in the main direction of illumination. In lamps in accordance with EP 0 678 700 A1 and FR 2 135 928, this has the result in a disadvantageous manner from a technical lighting aspect that the reflector opening, via which a direct lighting should take place with maximum efficiency, is shadowed regionally so that the ultimately achieved direct

lighting cannot take place over a full area and uniformly with the desired maximum intensity. With lamps in accordance with DE 195 07 333 A1, in contrast, it is of disadvantage that the reflection element, which only shadows the reflector in a small manner here in contrast to the last-named lamps, can only be lighted effectively over the reflector opening with very small dimensions so that the achieved ceiling brightening effect is low in accordance with the small reflection element.

Strip lamps are known from the document DE 44 43 916 C1 which have elongated side reflectors which are made light permeable in their upper region, whereas the lower region of the side reflectors which projects out of the installation surface is made impermeable to light. Only a low, hardly perceptible ceiling brightening can also be achieved with strip lamps of this type. In addition, the lighting principles disclosed in the named documents cannot be transferred without problem to downlights.

An object of the invention consists of further developing the built-in lamps known from the prior art such that an advantageous, glare-free ceiling brightening can also in particular be achieved with downlights with a sufficiently large effect perceptible without problem, without the efficiency of the direct light lighting simultaneously suffering to a relevant degree under the design measures required for the ceiling brightening effect.

This object is satisfied in accordance with the invention in that

- the reflector is made translucent or transparent at least sectionally in its region extending beyond the installation surface or is provided with openings; or

- in that, in addition to the reflector an additional light discharge region is provided which surrounds the reflector at least regionally and via which the reflection element can be illuminated by a portion of the light.

In accordance with the invention, possibilities are therefore opened up which are not yet known from the prior art to light the reflection element in an efficient manner such that a clearly perceptible ceiling brightening is adopted, with it simultaneously being ensured that light can be discharged from the direct light reflector completely without hindrance so that the efficiency of the direct light illumination is not negatively influenced in any way by the ceiling brightening. The principle in accordance with the invention can be used without problem with a corresponding shape of the reflector and of the reflection element both with downlights and with strip lights.

In that variant in accordance with the invention in which the reflector is made at least sectionally translucent or transparent in its region extending beyond the installation surface or is provided with openings, light can pass from the interior of the reflector into the region lying between the reflection element and the installation surface and then ultimately illuminates the reflection element from above. In this case, the reflection element can take over an additional masking function since it can prevent light from passing directly from the outer side of the translucent or transparent reflector into the eye of the observer. Alternatively – with a reduced masking function of the reflection element – it is also, however, possible to let the reflector appear illuminated directly at its outer side, which is of advantage from a design aspect in specific applications.

In that variant in accordance with the invention in which an additional light discharge region is provided in addition to the reflector, the reflection element can be illuminated by a portion of the light which does not come from the interior of the reflector. The additional light discharge region can extend in a plane which coincides at least substantially with the plane of the installation surface or which extends perpendicular or obliquely to the plane of the installation surface.

With lamps in accordance with the invention, it is

a securing possibility for the reflection element in accordance with the invention which extends outside the reflector, for example around it. This reflection element can now be illuminated by light in any desired manner from above via the region disposed below the installation surface and the reflection element so that this portion of the light is reflected by the reflection element in the direction of the installation surface, for example a room ceiling. In this manner, a lighting of the installation surface ultimately results from below in that the said portion of the light coming from the reflection element provides a "natural" ceiling brightening. In accordance with the invention, it is therefore possible to work according to the known dark-light principle at the interior of the reflector and the advantages resulting therefrom can be utilized, with a lighting of the installation surface, however, simultaneously taking place around the reflector within the framework of the mentioned ceiling brightening. This lighted region of the installation surface is always visible for the eye of the observer so that a visible marking of the light source is always ensured, which results in a room mood with a good light atmosphere felt to be pleasant despite the use of the dark-light principle. In addition, a generation of softer shadows and an advantageous wall brightening is achieved by the light which is reflected toward the installation surface and which in turn is directed from there as scattered light into the room to be lighted. Furthermore, a disadvantage shading of faces is avoided which usually occurs with a direct lighting from above.

In addition to these advantages, interesting design possibilities result from the reflection element in accordance with the invention, for example by an individual selection of the shape or of the color of the reflection element.

tion element is in particular interesting under design aspects since, depending on the light mood to be achieved, reflection elements with different shapes, a different optical behavior and/or different colors can be used without any changes having to be made to the rest of the built-in lamp.

It is in particular possible to arrange a plurality of reflection elements outside the reflector which can, for example, have sizes and/or colors differing from one another. This plurality of reflection elements can, for example, extend parallel to one another and can have different spacings to the installation surface.

Different possibilities exist for the lighting of the reflection element taking place from above via the region disposed between the installation surface and the reflection element.

For example, the reflector can be made translucent or transparent at least sectionally in its region extending beyond the installation surface or it can be provided with openings so that light from the interior of the reflector can pass into the region lying between the reflection element and the installation surface and then ultimately illuminates the reflection element from above. In this case, the reflection element can take over an additional masking function since it can prevent light from moving directly from the outer side of the translucent or transparent reflector into the eye of the observer.

Alternatively or additionally, it is possible, for example, to provide an additional light discharge region - in addition to the reflector - which surrounds the reflector at least regionally and via which the reflection

element can be illuminated by a portion of the light which does not come from the interior of the reflector. This additional light discharge region can extend in a plane which coincides at least substantially with the plane of the installation surface or which extends perpendicular or obliquely to the plane of the installation surface.

It is particularly preferred for the interior space of the reflector and the additional light discharge region to be illuminated by a common illuminant, since in this way no separate illuminant has to be provided for the additional light discharge region. No additional illuminant costs thus arise with respect to built-in lamps known from the prior art and a change of the illuminant can also take place with the same effort as with already known built-in lamps.

It is advantageous for the reflector to have a first reflector opening disposed in the main direction of illumination and a second reflector opening disposed opposite to the main lighting direction, with an additional reflector or background reflector being associated with the second reflector opening. The additional reflector or background reflector disposed behind the second reflector opening opposite to the main direction of illumination can thus illuminate both the reflector itself and on the described additional light discharge region. With an arrangement of this kind, the illuminant radiates direct light into the main direction of illumination via the reflector, on the one hand, and in a direction opposite to the main direction of illumination to the additional reflector or background reflector, on the other hand, which deflects some of the light incident on it in the direction of the additional light discharge region and some of the light in the direction of the first reflector opening of the reflector in dependence

Claims

1. A built-in lamp having a holder for fastening in an installation surface (1, 3'), in particular a room ceiling (1), having an illuminant fitting (3) and having a reflector (8), wherein the holder and reflector (8) are arranged relative to one another such that the reflector (8) extends beyond the installation surface (1) in a main direction of illumination (A) with a built-in lamp secured in the installation surface (1), with the reflector being coupled in this region extending beyond the installation surface to a reflection element (6, 15) which extends perpendicular or at an angle to the main direction of illumination (A), is arranged outside the reflector (8) and can be illuminated by light via the region lying between the installation surface (1) and the reflection element (6, 15),
characterized in that
- the reflector is made translucent or transparent at least sectionally in its region extending beyond the installation surface (1) or is provided with openings; or
- in that, in addition to the reflector (8) an additional light discharge region (5, 12, 13) is provided which surrounds the reflector (8) at least regionally and via which the reflection element (16) can be illuminated by a portion of the light.

7. A built-in lamp in accordance with any one of the preceding claims, characterized in the additional light discharge region (5, 12, 13) extends in a plane which coincides at least substantially with the plane of the installation surface (1) or which extends perpendicular or obliquely to the plane of the installation surface (1).

8. A built-in lamp in accordance with any one of the preceding claims, characterized in that the inner space of the reflector (8) and the additional light discharge region (5, 12, 13) can be illuminated by a common illuminant (4).

9. A built-in lamp in accordance with any one of the preceding claims, characterized in that the reflector (8) has a first reflector opening (8) disposed in the main direction of illumination (A) and a second reflector opening (10) disposed opposite to the main direction of illumination (A), with an additional reflector or background reflector (11) being associated with the second reflector opening (10).

10. A built-in lamp in accordance with claim 9, characterized in that a light passage region is formed between the additional reflector or background reflector (11) and the reflector (8).

11. A built-in lamp in accordance with any one of the claims 9 or 10, characterized in that the additional reflector or background reflector (11) is formed at least partly by at least one planar or presettably curved or kinked reflector surface which ensures a presettable division of the portion of the reflected light directed to the reflector (8) and to the additional light discharge region (5, 12, 13).

12. A built-in lamp in accordance with any one of the preceding claims, characterized in that the illuminant (4) and the reflector (8) are arranged in a housing (2) which is in particular lightproof and/or dustproof and whose inner surface is made at least regionally as an additional reflector or background reflector (11).

13. A built-in lamp in accordance with claim 12, characterized in that the additional reflector or background reflector (11) is made as specularly reflecting or diffusely reflecting.

14. A built-in lamp in accordance with any one of the preceding claims, characterized in that the reflector (8) is made specularly reflecting or diffusely reflecting on its outer side.

15. A built-in lamp in accordance with any one of the claims 7 to 14, characterized in that the opening (9) of the reflector (8) disposed in the main direction of illumination is open; or
in that the housing (2) in accordance with claim 12 is terminated in an at least largely dustproof manner by a translucent or transparent plate in the region of the additional light discharge region (5, 12, 13) and by a further plate, in particular a transparent plate (7), in the region of the opening (9) of the reflector (8) disposed in the main direction of illumination.

16. A built-in lamp in accordance with any one of the preceding claims, characterized in that the reflector (8) can be released from the housing (2), in particular with the reflection element (6, 15).

17. A built-in lamp in accordance with claim 17, characterized in that the reflector (8) is supported at the housing (2) in an articulated manner or can be fastened by means of a releasable screw connection, magnet connection, clip connection, latch connection or bayonet connection.

18. A built-in lamp in accordance with any one of the preceding claims, characterized in that the reflector (8) is displaceably supported in the housing (2) in the main direction of illumination (A).

19. A built-in lamp in accordance with any one of the preceding claims, characterized in that an elongated illuminant (4) is provided in the reflector (8) and its longitudinal direction of extent coincides with the main direction of illumination (A) or its longitudinal direction of extent extends perpendicular to the main direction of illumination (A).